

Warm-up

Graph

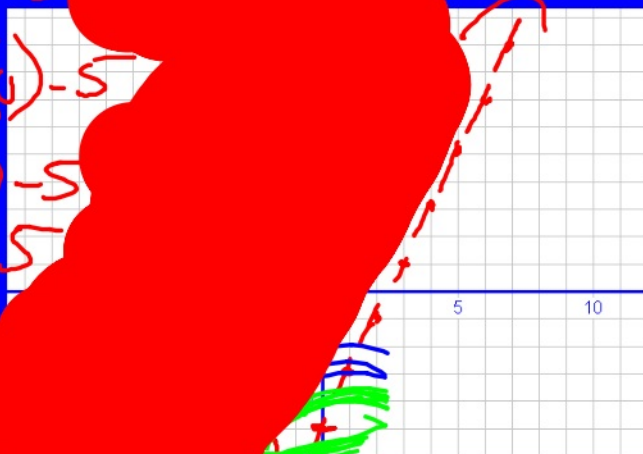
$$y + 5 > 2x$$

$$y > 2x - 5$$

$$0 > 2(0) - 5$$

$$0 > 0 - 5$$

$$0 > -5$$



7-1 Exponential function



Exponential function- has the form $y = ab^x$

(a) is a constant

$$a \neq 0$$

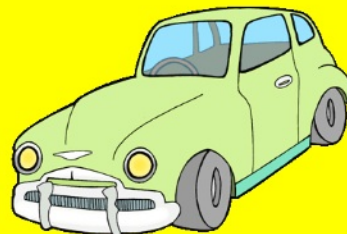
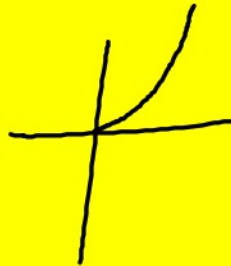
$$b > 0$$

$$b \neq 1$$

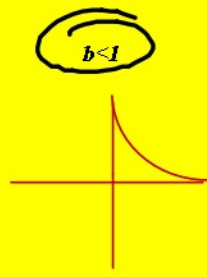
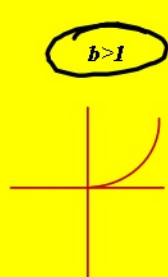
x is a real number



Can you think of anything
that grows exponentially?



When $a > 0$ the exponential function can be used to model growth or decay.



Growth or Decay

Growth

$$y = 2 \underline{(1.2)}^x$$

$$y = 4 \underline{(2.1)}^x$$

$$y = 4 \underline{(1.4)}^x$$

Decay

$$y = 2 \underline{(.7)}^x$$

$$y = 3 \underline{(.65)}^x$$

$$y = .2 \underline{(.89)}^x$$

EX 1

$$Y = 64(.5)^x$$

Try for $x = 0, 1, 2, 3, 4$

$b = \underline{.5}$ Growth or Decay?

$$Y = 64(.5)^x$$

x	Y
0	64
1	32
2	16
3	8
4	4

EX 2

The population of the USA in 1994 was about 260 million, with an average annual rate of increase of about 0.7%.

$$\begin{array}{l} a = 260 \\ b = .7\% \rightarrow .007 \rightarrow 1.007 \\ x = 15 \end{array} \quad \begin{array}{c} \rightarrow \\ \text{Increase} \end{array}$$

Use this equation to estimate the population in the year

$$y = 260(1.007)^{15} \quad 2009$$
$$y \approx 288$$

Expected decrease in a new car:

<http://www.kbb.com/>

If the initial value of the car is \$20,000 and after one year the car is now worth \$17,000, find the exponential function to estimate the value of the car in 5 years.

$$a = 20,000$$

$$b = .85$$

$$x = 5$$

$$y = 20,000(.85)^5$$
$$y = \$8874.$$

$$\begin{array}{r} 20,000 - 17,000 \\ \hline 3,000 \\ \hline 20,000 \end{array}$$
$$\frac{3,000}{20,000} = .15$$

Amount
Lost

Exit Pass

Give 2 equations that have exponential growth, and 2 that have exponential decay.

G

$$y = 2(1.9)^x$$

90%

D

$$y = 2(.2)^x$$

80%

Homework p.308(1-9) and (19-22)

